JANUARY 31, 1983

CHEMICAL & ENGINEERING

NEWS

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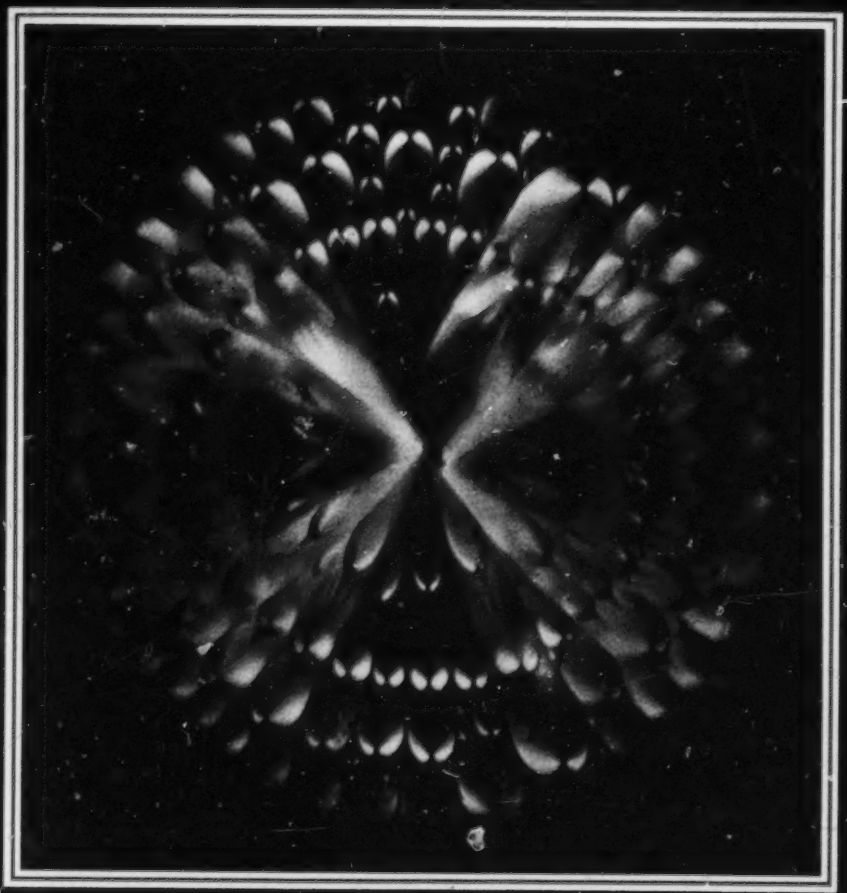

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Liquid crystals

A colorful state of matter

Page 24

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Cover: Focal conic texture of a smectic A liquid crystal, as seen in a photomicrograph by Alfred Saupe, Liquid Crystal Institute

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CHEMICAL & ENGINEERING
NEWS
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News of the Week

■ **U.S. chemical companies finish 1982 in a slump, hope the coming year will be better.** **Page 4**

■ **Detection of the subatomic W particle causes a stir in the physics community.** **Page 5**

■ **Basic petrochemicals producers are confident they can withstand lower OPEC prices.** **Page 5**

■ **Long-range projections by NSF show national R&D spending at $45 billion level by 1990.** **Page 6**

■ **International studies tend to support the alleged use of chemical arms in Southeast Asia.** **Page 6**

Business

Air Products & Chemicals looks to shift in markets to help reverse recession losses; high-technology markets favored. **Page 8**

International

Japan's petrochemical industry seeks solutions to its ills, focuses on restructuring to cut excess capacity. **Page 11**

Government

Polymetallic sulfide deposits found in both Atlantic and Pacific oceans contain some strategically important materials, pose problems for government regulation. **Page 14**

Science

Electron density mapping is being applied to molecules containing heavy elements, and is providing reliable information. **Page 17**

Biotechnology seen as helpful for solving agriculture, health, and energy problems in developing nations. **Page 19**

Research in physical chemistry gets a boost from more advanced techniques in spectroscopy, magnetic resonance. **Page 20**

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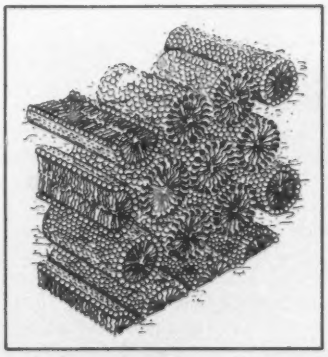

Special Report

Liquid crystals occupy a grey area between true solids and true liquids, but have unique properties of their own. **Page 24**

er major benzene source, is down to about 30%.

As a result, the spot price of benzene, for several months well below the listed price, has now moved up to the same level as the effective contract price of $1.45 per gal. In normal times, that would mean the contract price was poised to rise again.

Analysts say that even a $4.00 reduction of the benchmark crude oil price would not affect aromatics pricing. Refinery output is expected to remain low, because most analysts do not believe even cheaper gasoline or heating oil would stimulate consumer demand enough for several months to raise capacity utilization. That will keep aromatics production low. "No one is going to crank up a refinery to make aromatics," one observer remarks.

Producers' confidence wanes at the mention of an oil price collapse. In that case, they say, aromatics prices would react within a few weeks to customer pressure for lower prices. But few producers or analysts expect a much lower petroleum price. Political and commercial expediency, they predict, will get the OPEC members to patch up their differences before that happens. □

NSF projects 1990 R&D spending of $45 billion

In 1990, national R&D expenditures will reach between $43.5 billion and $46.7 billion, in 1972 dollars. These figures are based on average annual increases of 2.5 to 3% over 1979 expenditures of $33.8 billion, compared to an average annual increase of 4.5% between 1975 and 1979.

That's the R&D outlook projected by the National Science Foundation in a current analysis of R&D funding trends. NSF made its first attempt at long-range projections of national R&D spending in 1976, looking toward such expenditures in 1985. The current analysis employs the same techniques, with a major exception being that of industry funds. The current projection makes use of an R&D cost per employee ratio and applies it to projected employment data, whereas in 1976 the analysis used an R&D-to-sales ratio and applied it to projected sales.

In a breakdown of 1990 R&D spending, the federal government is projected to increase its R&D spending by an average of about 2% per year in constant dollars between 1979 and 1990. Defense, now about half the federal R&D total, is projected to grow sharply during the early 1980s and to slow slightly thereafter. Industry's share of federal R&D dollars would increase from 45% in 1979 to more than 50% in 1990, because nearly two thirds of defense R&D is contracted to industry.

Universities and colleges and other nonprofit institutions are projected to increase their R&D spending from all sources by an average of 2% per year in real terms between 1979 and 1990, about half the rate between 1975 and 1979. Reflecting increased defense spending, federal R&D support of these institutions is expected to increase only 1% per year to 1990, a decline in growth from 3% annually over earlier periods. Nonfederal support is projected to continue at about the same 3% rate.

NSF expects industrial R&D spending to increase at average annual constant-dollar rates of 3 to 4% between 1979 and 1990. It expects growth to be greatest in computer- and instrument-related industries, about 50% higher than the all-industry average. The analysis projects industrial spending on chemical R&D, including drugs, to reach between $2.97 billion and $3.16 billion in 1990 (in 1972 dollars), up from $2.26 billion in 1979. □

Industry will lead the way in 1990 R&D funding

$ Millions, 1972	1979	1990 High	1990 Low
Federal government	$16,545	$20,425	$19,775
Industry	15,990	24,424	21,988
Universities and colleges	733	1,050	1,000
Other nonprofit institutions	514	775	725
TOTAL	$33,782	$46,674	$43,488

French findings hint yellow rain toxin use

The French Ministry of External Relations says that international studies, with France's participation, tend to support allegations that chemical arms are being used in Southeast Asia. A spokesman for the ministry says the weapons are not of natural origin and are not indigenous to the region.

That statement follows reports from the French Embassy in Bangkok, Thailand, that France had collected specimens from the Thai-Kampuchean border, where Kampucheans are fighting Vietnamese forces, and had analyzed these samples in Paris. Several of the specimens have tested positive for the so-called yellow-rain toxins.

An unnamed French diplomat in Bangkok is reported to have said that some of the biological samples contained high concentrations of mycotoxins. A spokesman for the French Embassy in Washington, D.C., reading from an *Agence France Presse* dispatch, says that France will not reveal more information until there is "absolute and definitive evidence."

It is unclear whether France is awaiting rigorous confirmation of its own chemical analyses, or further proof of the U.S. allegation that the Soviet Union is supplying yellow-rain toxins to its Vietnamese allies.

The State Department would eagerly welcome the French findings. For the moment, State is trying to clarify whether the statements made are official French government announcements supporting U.S. allegations, or merely the pronouncements of individual French diplomats. Should the statements be deemed official, they will considerably bolster the credibility of U.S. allegations.

Several earlier Canadian studies have given only qualified support to the U.S. charges. U.K. tests of yellow-rain samples have been inconclusive. And the United Nations investigative team last December found "circumstantial" evidence of chemical warfare in Southeast Asia. □